EVALUATION OF EVISCERATED BODY CHARACTERISTICS OF BROILER FINISHER CHICKENS FED HIGH FIBRE DIETS SUPPLEMENTED WITH INSOLUBLE GRIT (GRANITE)

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ABSTRACT:
Eviscerated body characteristics of broiler finisher chickens fed high fibre diets supplemented with insoluble grit (granite) was evaluated. Broiler finisher diets were formulated and granite grit supplemented at 0.0, 2.0, 4.0, 6.0, 8.0 and 10.0g respectively. Live weight, dressing percentage, wing, breast, thigh, gizzard and back weight significantly (P<0.05) increased with increasing levels of granite grit. Birds fed 6.0, 8.0 and 10.0g dietary granite grit showed significantly (P<0.05) higher live weight, slaughter weight, dressing percentage, thigh and back weight compared to other levels. This was attributed to increased abrasion of feed in the gizzard which enhanced feed utilization. It was concluded that 10.0g granite grit is beneficial to finishing broiler chickens as they attain higher live weight, dressing percentage and other carcass characteristics.
Keywords: granite grit, broiler, fibre

INTRODUCTION
There is an increasing demand in the search for alternative feed resources for which there is little or no competition with man (Idachaba, 2012). Most non-conventional feedstuffs used in poultry diet contain high amount of non-starch polysaccharides that cannot be hydrolyzed by simple stomach animals (Morgan and Bedford, 1995). Studies have shown that the negative effect caused by the presence of non-starch polysaccharides can be overcome by dietary modifications which include the use of grit materials (Atteh, 2003). Grits are hard insoluble or soluble particles which remain trapped in the thick-muscled gizzard to facilitate grinding of feed (Chiba, 2009). It was reported by Abeke *et al.* (2010) that inclusion of grit in the diet of monogastric animals is not generally practiced as a means of improving performance through better feed utilization. This assertion is true as most poultry producers in Nigeria are unaware of the benefit of grit addition in poultry diets. Leeson and Summers (2001) reported that the benefit of granite grit in poultry nutrition includes increased abrasion in the gizzard, improved nutrient digestibility and better utilization of fibrous feed materials. Based on this premise, eviscerated body characteristics of broiler finisher chickens fed high fibre diets with graded levels of granite grit supplementation was evaluated.

MATERIALS AND METHODS
Experimental site: The research was conducted at the poultry unit of the National Animal Production Research Institute, Shika Zaria. It is located on latitude 11° 12' 42'' N and 7° 33'14''E at an altitude of 691m above sea level (Ovimaps, 2012).

Source of experimental birds and preparation of granite grit: Broiler chickens used for the research were purchased from a commercial hatchery located in Ibadan, south western Nigeria. Granite grit was obtained from a quarry in Zaria and was sieved to 5mm size with the aid of a hand sieve.

Laboratory analysis: Proximate analysis of feed was carried out at the biochemistry laboratory unit of the National Animal Production Research Institute, Shika-Zaria according to the methods described by A.O.A.C. (1990).

Experimental diet: The experimental diet is presented in Table 1. A single diet was formulated for birds across all dietary treatments. The diet was formulated to meet their nutrient requirements according to the recommendations given by NRC (1994).

Design and management of birds: Two hundred and seventy (270) finishing broiler chickens were used in this study. The birds were allotted to six experimental treatments. Each treatment was replicated three times with fifteen (15) chickens per replicate in a completely randomized design. Crude fibre content of the diet was 8.39%. Granite grit was extraneously added to their diet at graded levels of 0.0, 2.0, 4.0, 6.0, 8.0 and 10.0gram per bird per month for the six treatments respectively. To determine the actual quantity of grit to be fed per replicate, the number of chickens in each replicate was multiplied by the representative grit

quantity for that replicate and this was then mixed in their feed once at the finisher phase.

Evaluation of carcass characteristics: After twenty eight days of the finishing phase, two broiler chickens were randomly selected from each replicate and housed separately for the evaluation of eviscerated body characteristics. They were starved of feed overnight but had free access to water. Their live weights were taken after which they were bled. Dressing percentage was calculated, while weights of the breast, thigh, wing, back, heart, kidney, liver, gizzard, head, neck, shank, and viscera were taken and expressed as percentages of the live weight.

Statistical analysis: Data obtained from the experiment was subjected to analysis of variance using the general linear model procedure of SAS (1993). Significant treatment means were separated using Duncan's Multiple Range Test according to procedures described by Steel and Torrie (1980).

RESULTS AND DISCUSSION

Dressing percentage and vital body parts such as breast, thigh and back was significantly ($P<0.05$) higher for birds fed 6.0, 8.0 and 10.0g granite grit compared to other treatments. Gionfriddo and Best (1995) reported that addition of grit to the diet of poultry birds help to stimulate the secretion of digestive enzymes which aid to facilitate digestion. According to Ryan (2002), this means that ingested feed will be efficiently digested and body nutrient requirements will be met. No significant difference ($P>0.05$) was observed in weight of internal organs such as liver and heart thus indicating that granite grit is not of adverse effect to the health of broiler chickens. Gizzard measurement increased significantly ($P<0.05$) with increasing levels of granite grit with birds fed 10.0g granite grit having the highest gizzard weight. Birds fed 6.0 and 8.0g granite grit showed comparable ($P>0.05$) results while birds fed the control diet had the least gizzard weight. Yildiz *et al.* (2001) reported that feeding insoluble grit to broiler chickens results in increased thickness of gizzard muscle. This enhanced thickness of the gizzard muscle may have resulted in abrasion in the gizzard with consequent improved utilization of the fibrous diets as evident in the highest final weight at 6.0, 8.0 and 10.0g granite grit levels.

Conclusion

Live weight, dressing percentage, wing, breast, thigh, gizzard and back weight significantly ($P<0.05$) increased with increasing levels of granite grit. Birds fed 6.0, 8.0 and 10.0g dietary granite grit showed the best results compared to other levels. It was concluded that 6.0g granite grit is beneficial to finishing broiler chickens fed fibrous diets as it increases the live weight, dressing percentage and other carcass characteristics.

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Table 1: Composition of experimental diet for broiler finisher (5-8weeks)

	Level of Stone grit (g)					
	0.0	2.0	4.0	6.0	8.0	10.0
Maize	46.15	46.15	46.15	46.15	46.15	46.15
Full fat soya	22.90	22.90	22.90	22.90	22.90	22.90
Rice offal	15.00	15.00	15.00	15.00	15.00	15.00
Groundnut cake	4.00	4.00	4.00	4.00	4.00	4.00
Fish meal	3.00	3.00	3.00	3.00	3.00	3.00
Blood meal	3.00	3.00	3.00	3.00	3.00	3.00
Bone meal	3.00	3.00	3.00	3.00	3.00	3.00
Palm oil	1.50	1.50	1.50	1.50	1.50	1.50
Lime stone	0.50	1.50	1.50	1.50	1.50	1.50
Common salt	0.30	0.30	0.30	0.30	0.30	0.30
Premix	0.25	0.25	0.25	0.25	0.25	0.25
Methionine	0.20	0.20	0.20	0.20	0.20	0.20
Lysine	0.20	0.20	0.20	0.20	0.20	0.20
Total	100	100	100	100	100	100
Calculated Analysis						
ME Kcal/kg	2923	2923	2923	2923	2923	2923
Crude protein (%)	20.00	20.00	20.00	20.00	20.00	20.00
Crude fibre (%)	8.39	8.39	8.39	8.39	8.39	8.39
Ether extract (%)	8.52	8.52	8.52	8.52	8.52	8.52
Available P. (%)	0.60	0.60	0.60	0.60	0.60	0.60
Lysine (%)	0.85	0.85	0.85	0.85	0.85	0.85
Methionine (%)	0.40	0.40	0.40	0.40	0.40	0.40
Meth + cystine (%)	0.60	0.60	0.60	0.60	0.60	0.60
Calcium (%)	0.82	0.82	0.82	0.82	0.82	0.82
Cost/kg diet (N)	78.63	78.63	78.63	78.63	78.63	78.63

Table 2: Eviscerated body characteristics of finishing broilers fed high fibre diets with graded levels of stone grit

	Level of Stone grit (g)						
	0.0	2.0	4.0	6.0	8.0	10.0	SEM
Live wt. (g)	1816.70^{b}	1890.00^{b}	1850.00^{b}	1983.30^{a}	2050.00^{a}	2053.30^{a}	78.19
Slaughter wt.(g)	1733.30^{b}	1830.00^{b}	1766.70^{b}	1916.70^{a}	1983.30^{a}	1985.30^{a}	73.93
Dressed wt.(g)	1466.70^{d}	1581.30^{c}	1442.80^{d}	1627.00^{b}	1762.15^{a}	1791.10^{a}	56.53
Dressing (%)	80.73^{b}	81.09^{b}	77.99^{b}	82.66^{a}	85.96^{a}	85.97^{a}	1.66
Breast (%)	15.83	15.94	15.99	16.72	18.31	18.95	0.80

Thigh (%)	17.00^{c}	18.84^{b}	18.05^{b}	20.84^{a}	20.23^{a}	21.84^{a}	0.87
Back (%)	16.26^{b}	17.36^{a}	14.70^{c}	16.78^{a}	17.35^{a}	17.87^{a}	0.59
Wing (%)	8.14^{b}	7.79^{b}	8.08^{b}	9.58^{a}	8.42^{b}	9.94^{a}	0.18
Shank (%)	3.33	3.69	3.54	3.55	3.49	3.73	0.22
Neck (%)	4.60	5.00	4.92	5.01	4.12	4.29	0.45
Gizzard (%)	1.87^{d}	2.29^{c}	2.34^{c}	2.52^{b}	2.67^{b}	3.29^{a}	0.19
Heart (%)	0.66	0.65	0.68	0.66	0.69	0.67	0.03
Liver (%)	2.51	1.72	1.98	2.19	2.54	2.06	0.23
Int. empty (%)	3.00^{b}	2.56^{b}	4.54^{b}	2.49^{b}	2.77^{b}	4.60^{a}	0.14
Intestine lt. (cm)	9.86	10.29	10.83	10.23	10.18	10.96	0.37

a,b,c= Means with different superscript on the same row differ significantly (P<0.05) Wt= weight, Lt= Length,